

TITLE: **STUDY OF RESERVOIR HETEROGENEITIES AND
STRUCTURAL FEATURES AFFECTING PRODUCTION IN THE
LOWER SHALLOW OIL ZONE, EASTERN ELK HILLS AREA,
CALIFORNIA**

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1. ABSTRACT

Program Introduction and Objectives

The purpose of this study is to determine the reasons for the change in the type of hydrocarbons produced from shallow marine reservoirs in the lower part of the Mio-Pliocene Etchegoin Formation (Gusher and Calitroleum sands) in the southern San Joaquin Basin near Bakersfield, California. These reservoirs produce oil in the western part of the basin and natural gas from structurally lower reservoirs farther east in the Bakersfield Arch area. The study area is the Elk Hills and Coles Levee oilfields near the center of the basin. The methods used by the project consist of computer mapping and geologic interpretation.

Accomplishments Achieved During Current Period of Performance

Three student researchers are participating in the project. The first three months consisted of data collection and database compilation. The students loaded digital data from over 500 Elk Hills wells into a geologic database. Aera Energy donated data from an additional 170 digital wells in the Coles Levee area. Oxy also gave the students access to confidential seismic data at their Elk Hills field office.

The second step consisted of checking the formation tops in the database for errors and establishing the location of major faults. This was accomplished by constructing structure contour maps of two stratigraphic horizons. Inaccurate tops showed up as distortions and “bulls-eyes” in otherwise smooth contours. The maps generated during

this step also gave us a rough indication of the location of faults within the underlying strata. Some of these faults were verified with seismic data.

The students are currently working on generating isopach maps to establish the continuity of the Gusher and Calitroleum intervals. These maps consist of 1) gross stratigraphic sequences and 2) more detailed maps of individual sandstone reservoirs within the sequences. The well logs give us concrete data at specific points while the seismic gives us “softer” data with a more continuous coverage.

Stratigraphic tops picked by Oxy geologists on the Elk Hills data differ from those picked by Aera geologists at Coles Levee and the students are trying to make the picks uniform so that the isopach maps are meaningful. Unfortunately, while well data exists in the area between the two fields, most of the wells are very old and lack electric log data. The seismic data have been very helpful. These data appear to show the reservoir zones at Coles Levee being truncated westward against the structurally higher, eastern Elk Hills anticline. This suggests that the gas-producing horizons may actually be absent in the western part of the basin.

Plans for the Remaining Period of Performance

We are currently working on detailed velocity models for the seismic in the area between Elk Hills and Coles Levee to ascertain that the stratigraphic truncation of units observed on the seismic lines corresponds to the gas-bearing intervals of the Gusher and Calitroleum zones. Also, in mid-March, we received copies of electric logs from two new wells drilled by Oxy in the easternmost Elk Hills area where the data are sparse. We hope to verify the location of stratigraphic truncations observed on the seismic and incorporate the new well log data by mid-April so that we can finish generating our sequence isopachs and cross-sections and report our results.

2. STUDENTS RECEIVING SUPPORT FROM THE GRANT

Ariel Auffant, graduate student and employee at ChevronTexaco

Luz Sophia Guerrero Cobos, graduate student and intern at Occidental Petroleum

Adam Mahan, graduate student and employee at Aera Energy